

**Notice of Allowability**

Application No.

10/709,869

Examiner

David Nhu

Applicant(s)

KANGGUO ET AL.

Art Unit

2818

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 8/1/05.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☒ The drawings filed on 02 June 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

### REASONS FOR ALLOWANCE

2. Claims 1-20 are allowed.

3. The following is an examiner's statement of reasons for allowance: None of the references of record teaches or suggests as cited in claims 1, 17, 19: thereafter forming a dopant source layer overlying the liner, the dopant source layer not being disposed along the upper portion of the trench sidewall; annealing the semiconductor substrate to drive a dopant from the dopant source layer through the liner into the semiconductor substrate adjacent to the lower portion of the trench sidewall while preventing the dopant from being driven into the semiconductor substrate adjacent to the upper portion of the trench sidewall, wherein the liner functions as a diffusion barrier inhibiting diffusion of at least one of oxygen or the dopant into the semiconductor substrate during the step of forming the dopant source layer, and permits the dopant to diffuse through the liner into the semiconductor substrate during the step of annealing to form the buried plate (as cited in claim 1); forming a dopant source layer overlying the liner along a lower portion of the trench sidewall; forming a cap layer covering at least an upper portion of the trench sidewall above the lower portion; annealing to drive a dopant from the dopant source layer through liner into the semiconductor substrate adjacent to the lower portion to form a buried plate, wherein the liner functions as a diffusion barrier inhibiting diffusion of at least one of oxygen or the dopant into the semiconductor substrate during the step of forming the dopant source layer, and permits the dopant to diffuse through the liner into the semiconductor substrate during the step of annealing to form the buried plate (as cited in claim 17); forming a cap layer covering at least an upper portion of the trench sidewall above the lower portion; annealing to drive a dopant from the dopant source layer through liner into

Art Unit: 2818

the semiconductor substrate adjacent to the lower portion to form a buried plate; removing the cap layer, the dopant source layer and the liner from at least the lower portion of the trench sidewall; forming a node dielectric along the lower portion of the trench sidewall; and forming a node electrode on a side of the node dielectric opposite the buried plate, wherein the liner functions as a diffusion barrier inhibiting diffusion of at least one of oxygen or the dopant into the semiconductor substrate during the step of forming the dopant source layer, and permits the dopant to diffuse through the liner into the semiconductor substrate during the step of annealing to form the buried plate (as cited in claim 19).

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### CONCLUSION

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Kudelka et al (6,426,254 B2): Method for Expanding Trenches by an Anisotropic Wet Etch.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM.

The examiner's supervisor, David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

Application/Control Number: 10/709,869

Page 4

Art Unit: 2818

*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956*

David Nhu



August 16, 2005

**DAVID N. H.**  
**PRIMARY**